SECTION 03 05 18

PRESTRESSED CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Prestressing tendons, anchors, coatings, sheathing, couplings, sleeves and gaskets.

B. Concrete and grout.

1.02 RELATED SECTIONS

A. Concrete formwork is specified in Section 03 11 00 - Concrete Forming.

B. Concrete falsework is specified in Section 03 11 14 - Falsework.

C. Reinforcing steel for concrete (typical rebar) is specified in Section 03 20 00 - Concrete Reinforcing.

D. Cast-in-place concrete is specified in Section 03 30 00 - Cast-In-Place Concrete.

E. Portland-cement concrete is specified in Section 03 05 15 - Portland Cement Concrete.

F. Finishing and curing of concrete are specified in Section 03 35 00 - Concrete Finishing, except as modified herein for precast, prestressed concrete.

G. Requirements for precast concrete are specified in Section 03 40 00 - Precast Concrete.

1.03 MEASUREMENT AND PAYMENT

A. General: Measurement and payment for prestressed concrete will be either by the lump-sum method or by the unit-price method as determined by the listing of the bid item for prestressed concrete indicated in the Bid Schedule of the Bid Form.

B. Lump Sum: If the Bid Schedule indicates a lump sum for prestressed concrete, the lump-sum method of measurement and payment will be in accordance with Section 01 20 00 - Price and Payment Procedures, Article 1.03.

C. Unit Price

1. If the Bid Schedule indicates a unit price for prestressed concrete, the unit-price method of measurement and payment will be as follows:

a. Measurement:

1) Cast-in-Place, Post-Tensioned, Prestressed Concrete: Concrete for prestressed concrete will be measured for payment by the cubic yard, as specified in Section 03 30 00 - Cast-In-Place Concrete, and will include prestressing steel tendons, sheathing and ducts, distribution plates,

anchorage devices, grout, reinforcing steel, embedded items, and prestressing operations, as applicable.

2) Precast/Prestressed Concrete: Precast, prestressed concrete members will be measured for payment by the individual unit (each), erected and installed in place, multiplied by the total number of identical units installed, and will include prestressing steel tendons, sheathing ducts, distribution plates, anchorage devices, grout, reinforcing steel, embedded items, and prestressing operations, as applicable.

b. Payment: Prestressed concrete will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.03.C.1.a.

1.04 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 Standard Specifications for Structural Concrete

2. ACI 318 Building Code Requirements for Structural Concrete

B. Precast/Prestressed Concrete Institute (PCI):

1. PCI MNL 116 - Manual of Quality Control for Plants and Production of Precast and Prestressed Concrete Products

2. PCI Design Handbook – Precast and Prestressed Concrete

C. Post-Tensioning Institute (PTI):

1. Post-Tensioning Manual

1.05 DEFINITIONS

A. The words and terms used in these Specifications conform with the definitions given in ACI 301 and ACI 318.

1.06 SUBMITTALS

A. General: Refer to Section 01 33 00 - Submittal Procedures, and Section 01 33 23 - Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.

B. Shop Drawings: Comply with requirements of ACI 301, Section 9 – Prestressed Concrete.

C. Preliminary Data: Comply with requirements of ACI 301 Section 9 – Prestressed Concrete.

D. Field Data: Comply with requirements of ACI 301, Section 9 – Prestressed Concrete.

1.07 QUALITY ASSURANCE

A. Governing Standards:

1. American Concrete Institute: ACI 301 in its entirety is hereby incorporated into these Specifications. ACI 301, Section 9 – Prestressed Concrete, and ACI 318, Chapter 18 – Prestressed Concrete, shall govern the work of this Section, as applicable.

2. Precast/Prestressed Concrete Institute: Comply with the herein referenced PCI Manual 116 and the PCI Design Handbook – Precast and Prestressed Concrete, as applicable.

3. Post-Tensioning Institute: Comply with the herein referenced PTI Post-Tensioning Manual, as applicable.

B. Testing: Comply with ACI 301, Section 9 – Prestressed Concrete, for the following test requirements:

1. Test assembly;
2. Static test;
3. Dynamic test for unbonded tendons; and
4. Grout testing.

C. Tolerances: Comply with requirements of ACI 301, Section 9 – Prestressed Concrete.

D. Precast, Prestressed Concrete: Comply with requirements of Section 03 40 00 - Precast Concrete, as applicable to the precast and erection portions of the work.

1.08 PRODUCT DELIVERY, HANDLING, AND STORAGE

A. Comply with requirements of ACI 301, Section 9 – Prestressed Concrete.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide materials that comply with ACI 301, Section 9 – Prestressed Concrete, as follows:

1. Prestressing tendons;
2. Coatings for unbonded tendons;
3. Sheathing for bonded tendons;
4. Sheathing for unbonded tendons;
5. Anchorages for bonded tendons;
6. Anchorages for unbonded tendons;
7. Couplings; and
8. Sleeves and gaskets.

2.02 DESIGN OF CONCRETE AND GROUT MIXTURES

A. Concrete: Comply with requirements of Section 03 05 15 - Portland Cement Concrete. Provide Class 6000 concrete unless otherwise indicated. Proportion concrete mixtures in accordance with ACI 301, Section 4 – Concrete Mixtures.

B. Grout: Comply with requirements of ACI 301, Section 9 – Prestressed Concrete.

PART 3 - EXECUTION

3.01 INSPECTION

A. Comply with requirements of ACI 301, Section 9 – Prestressed Concrete.

3.02 PREPARATION

A. Comply with requirements of ACI 301, Section 9 – Prestressed Concrete, as follows:

1. Grouting; and
2. Tendons and concrete.

3.03 PLACEMENT

A. Comply with requirements of ACI 301, Section 9 – Prestressed Concrete, as follows:

1. Tendons and accessories; and
2. Grout.

3.04 TENSIONING AND OTHER OPERATIONS INVOLVING TENDONS

A. Comply with requirements of ACI 301, Section 9 – Prestressed Concrete, as follows:

1. Sequence;
2. Tensioning multiple;
3. Prestressing force;
4. Prestress loss;
5. Formwork;
6. Prevention of damage to tendons, and
7. Trimming of tendons.

END OF SECTION 03 05 18